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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,552	08/22/2003	Sungkwon C. Hong	M4065.0953/P953	9137

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EXAMINER

PHAM, LONG

ART UNIT PAPER NUMBER

2814

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AL

Office Action Summary	Application No.	Applicant(s)	
	10/645,552	HONG, SUNGKWON C.	
	Examiner	Art Unit	
	Long Pham	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 10-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

New grounds of rejection

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1, 2, 3, 4, 5, 6, 10, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art AAPA of this application in combination with Tsukamoto (US 5,047,818).

With respect to claims 1, 4, and 11, AAPA teaches a pixel cell comprising (see fig. 1 and the Background of the Invention on pages 1-3 of this application):
a photo-conversion device that generates charges;
a charge storage region that stores the charges; and
a transistor having a gate between the photo-conversion device and the charge storage region for transferring the charges from the photo-conversion device to the charge storage region.

However, AAPA fails to teach the charge storage region comprises of: a doped region of a second conductivity type, a doped surface layer of a first conductivity type over and in contact with the doped region, and a control gate is being over the doped surface layer.

Tsukamoto teaches a charge storage region that comprises a doped region 12 of a second conductivity, a doped surface layer 11 of a first conductivity type over and in contact with the doped region, and a control gate 5 being over the doped surface layer. See figs. 1-3 and the associated text.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the charge storage region of Tsukamoto into the device of AAPA to prevent soft errors caused in the charge storage capacitor. See col. 2, lines 8-9.

With respect to claims 2 and 12, Tsukamoto further teaches that the charge storage region is part of a buried channel MOS capacitor. See figs. 1-3 and the associated text.

With respect to claim 3, Tsukamoto further teaches that the charge storage region is located below a surface of a substrate. See figs. 1-3 and the associated text.

With respect to claim 5, Tsukamoto further teaches the control gate 5 is made of doped polysilicon. See col. 3, lines 50-55.

With respect to claim 6, AAPA further teaches that the first transistor is a shutter transistor for determining an integration time for the pixel cell. See page 2, [0007] of this application.

With respect to claim 10, AAPA fails to teach that the photo-conversion device is a pinned photo-diode.

However, the use of pinned photodiode as photo-conversion device is well-known in the art of making semiconductor device.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 2, 3, 4, 5, 6, 10, 11, and 12 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

3. Claims 7-9 and 13-14 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on M-F, 7:30AM-3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Pham

Primary Examiner

Art Unit 2814

LP